

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 1. (currently amended) A method of automatically configuring a network device, the method  
2 comprising the computer-implemented steps of:  
3 receiving a request from the network device to provide configuration information;  
4 retrieving a template describing a device configuration, wherein the template  
5 comprises symbolic references to one or more parameters that may receive  
6 values specific to a particular device;  
7 retrieving one or more values of parameters specific to the network device;  
8 creating and storing a device-specific instance of the configuration information based  
9 on the template and the values of parameters specific to said network device;  
10 said configuration information conforming to an Extensible Markup Language  
11 Document Type Definition (XML DTD) and comprising one or more XML  
12 tags that delimit a beginning and an ending of the configuration information.

1 2. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2 testing the device-specific instance of configuration information to determine whether  
3 it is well-formed with respect to the XML DTD;  
4 providing the configuration information to the network device.

1 3. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2 testing the device-specific instance of configuration information to determine whether  
3 it is well-formed with respect to the XML DTD;  
4 providing the device-specific instance of configuration information to the network  
5 device over a reliable transport protocol, wherein the network device ensures

6 that all of the configuration information is received by checking the one or  
7 more XML tags that delimit a beginning and an ending of configuration  
8 information.

1 4. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2 providing the device-specific instance of configuration information to the network  
3 device; and  
4 at the network device,  
5 syntax checking the device-specific instance of configuration information to  
6 determine whether configuration commands therein conform to a  
7 command language that is understood by the network device;  
8 applying the device-specific instance of configuration information to the  
9 network device.

1 5. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2 providing the device-specific instance of configuration information to the network  
3 device; and  
4 at the network device,  
5 syntax checking the device-specific instance of configuration information to  
6 determine whether configuration commands therein conform to a  
7 command language that is understood by the network device;  
8 applying the device-specific instance of configuration information to the  
9 network device;  
10 when a syntax error is detected during the syntax checking step, publishing an  
11 event that reports the syntax error using an event service.

1 6. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2 providing the device-specific instance of configuration information to a plurality of  
3 network devices;  
4 at one of the network devices, syntax checking the device-specific instance of  
5 configuration information to determine whether configuration commands

6           therein conform to a command language that is understood by the network  
7           device;  
8       upon successful syntax checking, generating an event to an event service to which the  
9           plurality of network devices subscribe, wherein the event announces that the  
10          configuration commands conform to correct syntax;  
11       in response to receiving the event, applying the device-specific instance of  
12          configuration information to the network devices concurrently.

1    7. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2       providing the device-specific instance of configuration information to a plurality of  
3       network devices;  
4       upon successfully receiving the device-specific instance of configuration information  
5       at one of the network devices, generating an event to an event service to  
6       which the plurality of network devices subscribe;  
7       in response to receiving the event, applying the device-specific instance of  
8       configuration information to the network devices concurrently.

1    8. (currently amended) A method as recited in Claim 1, further comprising the steps of:  
2       applying the device-specific instance of configuration information to the network  
3       device;  
4       receiving a user request to cancel application of the configuration information;  
5       restoring the network device to its state prior to application of the device-specific  
6       instance of configuration information.

1    9. (original) A method as recited in Claim 1, wherein the step of receiving a request from the  
2       network device to provide configuration information comprises the step of receiving an  
3       HTTP request that identifies a configuration service that can provide the configuration  
4       information and that includes a unique identifier of the network device.

1    10. (original) A method as recited in Claim 1, wherein the step of receiving a request from  
2       the network device to provide configuration information comprises the step of receiving an

3 HTTP request that identifies an Active Server Page of a configuration service that can  
4 provide the configuration information and that includes a unique identifier of the network  
5 device.

1 11. (original) A method as recited in Claim 1, wherein the step of receiving a request from  
2 the network device to provide configuration information comprises the step of receiving an  
3 HTTP request that identifies a Java® Servlet of a configuration service that can provide the  
4 configuration information and that includes a unique identifier of the network device.

1 12. (currently amended) A method as recited in Claim 1, wherein the step of retrieving a  
2 template comprises the step of retrieving a template describing the configuration information,  
3 wherein the template comprises symbolic references to one or more parameters that may  
4 receive values specific to a particular device, and wherein the step of receiving one or more  
5 values of parameters specific to the network device comprises the step of retrieving a  
6 container object associated with the network device from the directory and obtaining the  
7 values of parameters from directory objects contained within the container object.

1 13. (currently amended) A method as recited in Claim 1, wherein the step of retrieving a  
2 template comprises the steps of:  
3       retrieving a reference to a template describing the configuration information from a  
4       directory service;  
5       retrieving the template from a configuration server based on the retrieved reference,  
6       wherein the template comprises symbolic reference to one or more parameters  
7       that may receive values specific to a particular device, and wherein the step of  
8       receiving one or more values of parameters specific to the network device  
9       comprises the step of retrieving a container object associated with the network  
10      device from the directory and obtaining the values of parameters from  
11      directory objects contained within the container object.

1 14. (currently amended) A method as recited in Claim 5, wherein the step of syntax checking  
2 comprises parsing one or more configuration commands within the device-specific instance

3 of configuration information using a parser of an operating system that is executed by the  
4 network device.

1 15. (currently amended) The method as recited in Claim 1, further comprising the steps of:  
2 determining that a partial configuration should be sent to one or more network  
3 devices;  
4 based on the template and the one or more values of parameters specific to the  
5 network device, creating and storing a device-specific instance of the partial  
6 configuration based on the template and the values of parameters and  
7 conforming to an Extensible Markup Language Document Type Definition  
8 (XML DTD), comprising one or more XML tags that delimit the partial  
9 configuration;  
10 publishing the partial configuration to an event service that is communicatively  
11 coupled to the one or more network devices.

1 16. (currently amended) The method as recited in Claim 1, further comprising the steps of:  
2 determining that a partial configuration should be sent to one or more network  
3 devices;  
4 based on the template and the one or more values of parameters specific to the  
5 network device, creating and storing a device-specific instance of the partial  
6 configuration based on the template and the values of parameters and  
7 conforming to an Extensible Markup Language Document Type Definition  
8 (XML DTD), comprising one or more XML tags that delimit the partial  
9 configuration;  
10 publishing a partial configuration trigger event to an event service that is  
11 communicatively coupled to the one or more network devices; and  
12 providing the partial configuration to one or more network devices in response to  
13 requests therefrom that are received in response to the trigger event.

1 17. (currently amended) A method of automatically configuring a network device, the  
2 method comprising the computer-implemented steps of:

3 generating a request to provide configuration information;  
4 receiving a set of configuration information conforming to an Extensible Markup  
5 Language Document Type Definition (XML DTD), the configuration  
6 information comprising one or more XML tags that delimit a beginning and  
7 an end of the configuration information, said set of configuration information  
8 based on a template describing a device configuration that is instantiated with  
9 one or more parameter values that are specific to the network device;  
10 syntax checking the set of configuration information to determine whether  
11 configuration commands therein conform to a command language that is  
12 understood by the network device;  
13 applying the configuration information to the network device.

1 18. (currently amended) A method as recited in Claim 17, wherein the set of configuration  
2 information is received concurrently at a plurality of network devices, and further  
3 comprising the steps of:  
4 at one of the network devices, syntax checking the set of configuration information to  
5 determine whether configuration commands therein conform to a command  
6 language that is understood by the network device;  
7 upon successful syntax checking, generating a status event to an event service to  
8 which the plurality of network devices subscribe, wherein the status event  
9 announces that the set of configuration commands conform to correct syntax;  
10 in response to receiving a “write” event, applying the set of configuration information  
11 to the network device.

1 19. (original) A method as recited in Claim 17, wherein the step of generating a request to  
2 provide configuration information comprises the step of generating an HTTP request  
3 that identifies a configuration service that can provide the configuration information  
4 and that includes a unique identifier of the network device.

1 20. (original) A method as recited in Claim 17, wherein the step of generating a request to  
2 provide configuration information comprises the step of generating an HTTP request

3 that identifies an Active Server Page of a configuration service that can provide the  
4 configuration information and that includes a unique identifier of the network device.

1 21. (original) A method as recited in Claim 17, wherein the step of generating a request to  
2 provide configuration information comprises the step of generating an HTTP request  
3 that identifies a Java® Servlet of a configuration service that can provide the  
4 configuration information and that includes a unique identifier of the network device.

1 22. (currently amended) A method as recited in Claim 17, wherein the step of receiving a set  
2 of configuration information comprises the steps of, at a configuration server,  
3 receiving a template describing the device configuration from a directory service,  
4 wherein the template comprises symbolic reference to one or more parameters that  
5 may receive values specific to a particular device, and wherein the step of receiving  
6 one or more values of parameters specific to the network device comprises the step of  
7 retrieving a container object associated with the network device from the directory  
8 and obtaining the values of parameters from directory objects contained within the  
9 container object.

1 23. (currently amended) A method as recited in Claim 17, wherein the step of syntax  
2 checking comprises applying the set of configuration commands to a parser of an  
3 operating system that is executed by the network device.

1 24. (currently amended) An apparatus for automatically configuring a network device,  
2 comprising:  
3 a configuration service configured for carrying out the steps of:  
4 receiving, from a configuration agent executed by the network device, a  
5 request to provide configuration information;  
6 retrieving a template describing a device configuration, wherein the template  
7 comprises symbolic reference to one or more parameters that may be  
8 resolved into values specific to a particular device;  
9 retrieving one or more values of parameters specific to the network device;

creating and storing a device-specific instance of the configuration information based on the template and the values of parameters specific to said network device and conforming to an Extensible Markup Language Document Type Definition (XML DTD), comprising one or more XML tags that delimit the configuration information, including at least one pair of XML tags that delimit a beginning and an end of the configuration information.

25. (currently amended) An apparatus as recited in Claim 24, further comprising:

one or more configuration templates stored in a directory service, wherein each of the configuration templates comprises an object in the directory service that describes the device configuration, and wherein the template comprises symbolic reference to one or more parameters that may receive values specific to a particular device;

one or more container objects stored in the directory service and associated with the network device, each of the container objects comprising values for the one or more parameters in one of the configuration templates that corresponds to the network device.

26. (currently amended) A computer-readable medium carrying one or more sequences of instructions for automatically configuring a network device, which instructions, when executed by one or more processors, cause the one or more processors to carry out the steps of:

receiving a request from the network device to provide configuration information;  
retrieving a template describing a device configuration, wherein the template comprises symbolic reference to one or more parameters that may be resolved into values specific to a particular device;  
retrieving one or more values of parameters specific to the network device;  
creating and storing a device-specific instance of the configuration information based on the template and the values of parameters specific to said network device and conforming to an Extensible Markup Language Document Type



13 Definition (XML DTD), comprising one or more XML tags that delimit the  
14 configuration information, including at least one pair of XML tags that delimit  
15 a beginning and an end of the configuration information.

1 27. (currently amended) An apparatus for automatically configuring a network device,  
2 comprising:

3 means for receiving a request from the network device to provide configuration  
4 information;

5 means for retrieving a template describing a device configuration, wherein the  
6 template comprises symbolic reference to one or more parameters that may be  
7 resolved into values specific to a particular device;

8 means for retrieving one or more values of parameters specific to the network device;

9 means for creating and storing a device-specific instance of the configuration  
10 information based on the template and the values of parameters specific to  
11 said network device and conforming to an Extensible Markup Language  
12 Document Type Definition (XML DTD), comprising one or more XML tags  
13 that delimit the configuration information, including at least one pair of XML  
14 tags that delimit a beginning and an end of the configuration information.

1 28. (currently amended) An apparatus for automatically configuring a network device,  
2 comprising:

3 a network interface that is coupled to a data network for receiving one or more packet  
4 flows therefrom;

5 a processor;

6 one or more stored sequences of instructions which, when executed by the processor,  
7 cause the processor to carry out the steps of:

8 generating a request to provide configuration information;

9 retrieving a set of configuration information conforming to an Extensible Markup

10 Language Document Type Definition (XML DTD), the configuration

11 information comprising one or more XML tags that delimit a beginning and  
12 an end of the configuration information, based on a template describing a

13 device configuration that is instantiated with one or more parameter values  
14 that are specific to the network device;  
15 syntax checking the set of configuration information to determine whether  
16 configuration commands therein conform to a command language that is  
17 understood by the network device;  
18 applying the configuration information to the network device.

1 29. (original) An apparatus as recited in Claim 28, wherein the step of syntax checking  
2 comprises the steps of determining whether the set of configuration information is well  
3 formed with respect to XML; determining whether the set of configuration information  
4 conforms to correct XML syntax; and determining whether the configuration commands  
5 conform to correct command language syntax.

1 30. (currently amended) An apparatus for automatically configuring a network device,  
2 comprising:  
3 a configuration agent executed by the network device and configured for carrying out  
4 the steps of:  
5 generating a request to provide configuration information;  
6 receiving a device-specific instance of configuration information based on a  
7 template describing a device configuration, wherein the template  
8 comprises symbolic reference to one or more parameters that may be  
9 resolved into values specific to a particular device, and based on one  
10 or more values of parameters specific to the device that are received  
11 from a repository, and wherein the template conforms to an Extensible  
12 Markup Language Document Type Definition (XML DTD),  
13 comprising one or more XML tags that delimit a beginning and an end  
14 of the configuration information;  
15 applying the device-specific instance of configuration information to the  
16 network device to result in re-configuring the network device in  
17 accordance with the template.

1 31. (currently amended) An apparatus as recited in Claim 30, further comprising:  
2 one or more configuration templates stored in a directory service, wherein each of the  
3 configuration templates comprises an object in the directory service that  
4 describes the device configuration, and wherein the template comprises  
5 symbolic reference to one or more parameters that may receive values specific  
6 to a particular device;  
7 one or more container objects stored in the directory service and associated with the  
8 network device, each of the container objects comprising values for the one or  
9 more parameters in one of the configuration templates that corresponds to the  
10 network device.

1 32. (previously amended) A method of automatically configuring a computer program  
2 application that uses information about network devices or topology in order to operate in a  
3 network environment, comprising the steps of:  
4 receiving a request for network topology information from the computer program  
5 application;  
6 retrieving a template of network topology information from a repository;  
7 resolving elements of the topology into application-specific values, resulting in  
8 creating and storing resolved topology information;  
9 providing the resolved network topology information to a configuration agent within  
10 the application that is configured to re-configure the computer program  
11 application to operate with the resolved network topology.

1 33. (original) A method as recited in Claim 32, wherein resolving elements of the topology  
2 includes the step of carrying out application-specific syntax checking of elements of  
3 the template.